

Nasonia Wasp Genome Completed

Advance important to parasitoid research

The genome of *Nasonia*, a parasitoid wasp used for genetic research since the 1950s, has been completed. This is big news in the genetics research community both domestically and around the globe, since the wasp is emerging as a new model system in genetics.

Scientists at the U.S. Horticultural Research Laboratory (USHRL) in Fort Pierce, Florida, played key roles in the efforts to unravel the genome.

The *Nasonia* genus consists of three closely related wasps: *N. vitripennis*, *N. giraulti*, and *N. longicornis*. These small insects seek out flies—notably blow flies, flesh flies, and house flies—then sting and lay their eggs in the fly pupae.

Nasonia are easy to work with in the laboratory, produce large families, and have a short generation time, which is the average age at which a female produces offspring. Visible and molecular markers are available in *Nasonia*, as well as additional genetic resources, and hosts for the wasps are available commercially and are easy to rear.

The project's genesis was in 2003, when ARS held a genetics symposium hosted by national program leader Kevin Hackett. In that meeting it was identified that additional work on parasitoid genomics was needed. Through some fact checking, USHRL entomologist Wayne Hunter found that University of Rochester (New York) genetics professor Jack Werren had already begun *Nasonia* genomics work. Hunter helped to produce genetic libraries and sequence some 10,000 expressed sequence tags of the genome. Werren

used this data and that of the Institute for Genomic Research to complete the *Nasonia* genome, which is expected to be released this year (2009).

"*Nasonia* are excellent organisms for research and teaching," says Hunter. "They've been the subject of genetic, ecological, evolutionary, and developmental research for more than 40 years."

Parasitic wasps, such as *Nasonia*, are extremely important regulators of agricultural pests. Biological control programs using parasitoid wasps save about \$20 billion annually by preventing crop losses to invasive species in the United States. These wasps have been a major benefit to food production for humans by reducing the amount of food crops destroyed by pests and reducing the need for pesticides.

For all these reasons, *Nasonia* was the logical first choice for sequencing of a parasitoid genome. Information from the

genome is being used to identify important genes in parasitoid biology, and there is broad interest in using the *Nasonia* genome to identify and annotate genes involved in important biological processes—such as sense of smell, behavior, and even enzymatic pathways.

More information on the *Nasonia* Genome Project and the genome sequencing can be found at www.rochester.edu/College/BIO/labs/WerrenLab/nasonia/genomeprojectindex.html.—By **Alfredo Flores**, ARS.

This research is part of Crop Protection and Quarantine, an ARS national program (#304) described on the World Wide Web at www.nps.ars.usda.gov.

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Parasitic wasp, *Nasonia vitripennis*.